

◆ EDITORIAL VIEWS

Anesthesiology
2000; 92:1217-8
© 2000 American Society of Anesthesiologists, Inc.
Lippincott Williams & Wilkins, Inc.

Difficult Mask Ventilation

An Underestimated Aspect of the Problem of the Difficult Airway?

ANTICIPATION of the difficult airway is of vital importance for improving the safety and efficacy of airway management in anesthesiology. Difficult airway management generally includes difficult laryngoscopy, difficult intubation, and sometimes difficult mask ventilation (DMV). Curiously, DMV seems to be an entity that has taken a back seat to the more glamorous problem of difficult intubation, and, to my knowledge, no previous specific studies regarding DMV alone have been performed. However, the ability to ventilate and oxygenate a patient using a bag-mask breathing system is essential for the anesthesiologist and may be lifesaving for the patient. In particular, the ability to ventilate the patient *via* a bag-mask system is a cornerstone in the case of failure of the initial intubation attempt in the operating room in the decisional algorithms published by the American Society of Anesthesiologists Task Force.¹ In this issue of ANESTHESIOLOGY, Langeron *et al.*² evaluate the incidence of DMV in the operating room. Using a novel definition of DMV, the authors found that DMV occurred in 5% of 1,502 general surgery patients. Five preoperative risk factors (age older than 55 yr, body mass index > 26 kg/m², presence of a beard, lack of teeth, and history of snoring) were independently associated with DMV. The presence of two of these criteria was the most accurate predictor for DMV, with a sensitivity and specificity of 0.72 and 0.73, respectively. Moreover, DMV has also been found to be significantly associated with difficult intubation.

This study is the first for which the principal and only purpose was to assess the incidence of DMV in the general operating-room population. As is the case for

difficult intubation, the incidence of DMV is strongly influenced by its definition. Langeron *et al.*² used a semisubjective set of criteria, including signs of inadequate ventilation (no perceptible chest movement, oxygen desaturation by pulse oximetry, perception of important gas flow leak around the mask), and alternative methods to facilitate mask ventilation (necessity to perform a two-handed mask ventilation technique, change of operator). Although this definition may seem a bit complex or confusing, it reflects the subjective assessment of difficulty by the anesthesiologist/operator in the study by Langeron *et al.*² To avoid the same confusion and the same incidence of variability of intubation difficulty observed in the literature³ because of the lack of standard definition, future studies must determine clearly the definition of DMV. (Why not a numerical scale inspired from the criteria of Langeron *et al.*?)

Finally, what is the clinical importance of DMV? Two clinical situations associated with DMV may present themselves to the anesthesiologist: (1) DMV may occur before attempting intubation (after induction of general anesthesia)⁴; or (2) DMV may occur after intubation failure. The first situation is curiously underestimated in the literature and in published decisional algorithms. The study by Langeron *et al.*² shows that this situation is relatively common given their reported incidence of 5%. In some of these patients, however, tracheal intubation may be achieved easily. Thus, an attempt at tracheal intubation may be a prudent first intervention, but the operator must be alert to the potential for adverse outcomes associated with DMV, and attempts at intubation must not be persistent.⁴ An alternative approach in this setting may be the use of laryngeal mask airway. The second situation (*i.e.*, failed initial intubation followed by DMV) generally follows the sequence of easy mask ventilation/difficult intubation and is often associated with multiple intubation attempts, leading to the development of progressive difficulty in ventilating the lungs with a face mask. The maximum risk is represented by the association of cannot ventilate-cannot intubate. Its incidence has been estimated to range between 0.01 and 2.0 of 10,000 patients,⁵ but Langeron *et al.*² reported a much greater incidence of 1.5%. Although the authors do not give any information concerning adverse outcomes or clinically significant injuries related to DMV, it

This Editorial View accompanies the following article: Langeron O, Masso E, Huraux C, Guggiari M, Bianchi A, Coriat P, Riou B: Prediction of difficult mask ventilation. ANESTHESIOLOGY 2000; 92:1229-36.

Accepted for publication January 27, 2000.

Key words: Airway management; anesthesia complication; anesthesia risk; difficult intubation.

The author is not supported by, nor maintains any financial interest in, any commercial activity associated with the topic discussed in this article.

is reasonable to anticipate that DMV, and particularly the association of difficult ventilation/intubation, is associated with airway morbidity.^{6,7} However, a large, prospective study is necessary to confirm this (perhaps false?) clinical impression.

The understanding of risk factors for DMV certainly has significant clinical implications. Clearly, most of the risk factors are not predictably associated with intubation difficulty (presence of beard, age) and probably do not pose a major clinical problem, but this knowledge may be useful in other areas of research. For example, the presence of these risk factors could explain most failures observed in noninvasive positive-pressure ventilation in the intensive care unit.

Langeron *et al.*² have provided the first large study attempting to explore difficult ventilation with a bag-mask system and associated predictive factors. This study should inspire further research concerning the clinical importance of DMV (*i.e.*, morbidity linked with DMV) and may have other applications in intensive care and emergency medicine research.

Frédéric Adnet, M.D., Ph.D.

Assistant Professor
Service d' Aide Medical d'Urgence (SAMU 93)
Hôpital Avicenne
Bobigny, France
frederic.adnet@avc.ap-hop-paris.fr

References

1. American Society of Anesthesiologists: Practice guidelines for management of the difficult airway. *ANESTHESIOLOGY* 1993; 78:597-600
2. Langeron O, Masso E, Huraux C, Guggiari M, Bianchi A, Coriat P, Riou B: Prediction of difficult mask ventilation. *ANESTHESIOLOGY* 2000; 92:1229-36
3. Rose DK, Cohen MM: The incidence of airway problems dependent on the definition used. *Can J Anaesth* 1996; 43:30-4
4. Crosby ET, Cooper RM, Douglas MJ, Doyle DJ, Hung OR, Labrecque P, Muir H, Murphy MF, Preston RP, Rose DK, Roy L: The unanticipated difficult airway with recommendations for management. *Can J Anaesth* 1998; 45:757-76
5. Benumof JL: Management of the difficult adult airway. *ANESTHESIOLOGY* 1991; 75:1087-110
6. Caplan RA, Posner KL, Ward RJ, Cheney FW: Adverse respiratory events in anesthesia: A closed claims analysis. *ANESTHESIOLOGY* 1990; 72:828-33
7. Domino KB, Postner KL, Caplan RA, Cheney FW: Airway injury during anesthesia. *ANESTHESIOLOGY* 1999; 91:1703-11